Virginia

Standards of Learning Assessments

Test Blueprint

Algebra II

2016 Mathematics Standards of Learning

This revised test blueprint will be effective with the administration of the 2018-2019 Mathematics Standards of Learning (SOL) tests.

Notice to Reader

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Algebra II
Standards of Learning

Test Blueprint

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General Test Information

Test Blueprint

Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content areas that will be addressed by the test and the number of items that will be included by content area and for the test as a whole. There is a blueprint for each test (e.g., grade 3 reading, grade 5 mathematics, grade 8 science, Virginia and United States History).

Reporting Categories

Each test covers a number of Standards of Learning (SOL). In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories. For example, a reporting category for the Algebra II Standards of Learning test is *Equations and Inequalities*. Each of the SOL in this reporting category addresses the solution or application of equations or inequalities. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a total test score.

Assignment of Standards of Learning to Reporting Category

In the Algebra II SOL test, each SOL is assigned to only one reporting category. For example, SOL AII.1a-c is assigned to "Expressions and Operations."

Coverage of Standards of Learning

Due to the large number of SOL in each grade level content area, *every* Standard of Learning will not be assessed on every version (form) of an SOL test. By necessity, to keep the length of a test reasonable, each version will sample from the SOL within a reporting category. Every SOL in the blueprint will be tested within a three year period, and *all of these* SOL are eligible for inclusion on each version of an SOL test.

Use of the Curriculum Framework

The Algebra II Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework asks essential questions, identifies essential understandings, defines essential content knowledge, and describes essential skills students need to master.

Algebra II
Test Blueprint Summary Table

Reporting Category	Algebra II SOL	Number of Items
Expressions and Operations	**AII.1a-c** **AII.2**	**11**
Equations and Inequalities	**AII.3a-d** **AII.4**	**12**
Functions and Statistics	**AII.5** **AII.6a-b** **AII.7a-k** **AII.8** **AII.9** **AII.10** **AII.11a-c** **AII.12**	**22**
Number of Operational Items		**45**
Number of Field-Test Items*		**10**
Total Number of Items on Test		**55**

*Field-test items are being tried out with students for potential use on subsequent tests and will not be used to compute students' scores on the test.

Algebra II
Expanded Test Blueprint

Reporting Category: Expressions and Operations
Number of Items: 11
Standards of Learning:

AII.1 The student will
a) add, subtract, multiply, divide, and simplify rational algebraic expressions;
b) add, subtract, multiply, divide, and simplify radical expressions containing rational numbers and variables, and expressions containing rational exponents; and
c) factor polynomials completely in one or two variables.

AII.2 The student will perform operations on complex numbers and express the results in simplest form using patterns of the powers of *i*.

Reporting Category: Equations and Inequalities
Number of Items: 12
Standards of Learning:

AII.3 The student will solve
a) absolute value linear equations and inequalities;
b) quadratic equations over the set of complex numbers;
c) equations containing rational algebraic expressions; and
d) equations containing radical expressions.

AII.4 The student will solve systems of linear-quadratic and quadratic-quadratic equations, algebraically and graphically.

Reporting Category: Functions and Statistics
Number of Items: 22
Standards of Learning:

AII.5 The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first n terms, determining the n^{th} term, and evaluating summation formulas. Notation will include $\sum$ and a_n.

AII.6 For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will
a) recognize the general shape of function families; and
b) use knowledge of transformations to convert between equations and the corresponding graphs of functions.

AII.7 The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include
a) domain, range, and continuity;
b) intervals in which a function is increasing or decreasing;
c) extrema;
d) zeros;
e) intercepts;
f) values of a function for elements in its domain;
g) connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
h) end behavior;
i) vertical and horizontal asymptotes;
j) inverse of a function; and
k) composition of functions, algebraically and graphically.

AII.8 The student will investigate and describe the relationships among solutions of an equation, zeros of a function, *x*-intercepts of a graph, and factors of a polynomial expression.

AII.9 The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of quadratic and exponential functions.

AII.10 The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.

AII.11 The student will
a) identify and describe properties of a normal distribution;
b) interpret and compare *z*-scores for normally distributed data; and
c) apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve.

AII.12 The student will compute and distinguish between permutations and combinations.